PHOTOMETRIC EXAMINATION OF SATURN'S RINGS AS SEEN IN CASSINI ISS IMAGES. J. W. Weiss[1], C.C. Porco[1], D.C. Richardson[2], L. Dones[3] [1]CICLOPS, Space Science Institute, 4750 Walnut St., Boulder, CO 80301. [2]Astronomy Department, University of Maryland, College Park MD 20742 [3]Southwest Research Institute, 1050 Walnut St, Boulder, CO 80302

Introduction: We have begun a photometric examination of Saturn's rings as seen in Cassini ISS [1] images with the goal of investigating the rings' particle properties (such as elasticity, size distribution, reflectivity, etc.) and disk characteristics, (such as thickness, particle number density, etc.) Our method is to apply a geometrical ray-tracing code to the output of an N-body simulation of a patch in the rings and compare the reflected and/or diffusely transmitted intensity to brightness measurements made on Cassini ring images taken from a variety of viewing geometries. In order to produce a realistic simulation, our particle boxes are produced by running an N-body `ring-patch' code (which accounts for the details of particle collisions and self-gravity) on a set of particles with a distribution of sizes, optical depth, surface mass density and photometric properties chosen to match the conditions believed to exist in the rings Our ray-tracing code can follow light rays from a source at an arbitrary direction as they pass through and emerge from these boxes. We account for singly and multiply scattered light, as well as the effects of reflected light from Saturn.

Previous applications of this technique have reproduced the shape and phase of the azimuthal asymmetry in Saturn's A ring (though not the amplitude) [2,3], and confirmed the asymmetry's origin as being due to self-gravity wakes in the A ring, a long-standing suggestion [4, 5, 6, 7]. We have also previously shown that the brightness of the rings at high phase is due to physically thin rings, rather than a large population of small particles [2].

Results: Cassini ISS has already returned an enormous number of images of Saturn's rings taken at different resolutions and from a variety of viewing geometries. We are in the process of applying our analysis methods to images taken at low phase of both the lit and unlit sides of the rings, and at high phase angles as well. Our results will be presented.

References: **[1]** Porco et al. 2004. *Space Science Reviews*, **115**, 363-497. **[2]** Porco et al. 1999. *BAAS,* **31,** 1140**.** **[3]** Porco et al. 2001. *BAAS* **33,** 1091 **[4].** Colombo et al. 1976. *Nature* **25,** 344-345 **[5]** Dones and Porco, 1989. *BAAS* ***21,*** *929.* *[6]* Salo and Karjalainen 2003. *Icarus*, **164,** 428-460 [7] Salo et al. 2004. *Icarus*, **170**, 70-90.